

REMARKSClaim Objections

The objections to claims 8 and 13-16 are respectfully traversed.

Applicants know of no statutory or regulatory basis for the requirement that the word “comprising” must be followed by a colon. Indeed, the undersigned attorney has been filing, and obtaining allowance of claims in the USPTO without the aforesaid colon for more than 35 years.

Applicants know of no statutory or regulatory basis for saying that a dependent claim cannot begin “The invention of claim ... Indeed, a quick search in the “claims” section of issued US patents in the Delphion patent database on February 20, 2008 revealed 14,219 U.S. patents issued since 1971 in which the phrase “The invention of claim ...” appears in the claims, including 188 U.S. patents issued in 2007 and 2008.

Rejection of Claim 1 — 35 USC 102

The rejection of claim 1 as being anticipated by Dolganow is respectfully traversed.

Applicants’ Invention

In accordance with applicant’s invention, an available bandwidth message, or advertisement, is issued when the amount of bandwidth available for a link crosses one of a set of fixed thresholds, such as the thresholds is 0.5, 2.5, 11.5, 23.5, 47.5 and 191.5 given in the example at ¶0030 of the specification.

An important aspect of applicants’ teachings is applicants’ realization that the prior art’s use of a fixed change in bandwidth or a percentage change in bandwidth (per Dolganow and the PNNI protocol, as discussed below)—even if the change is a very large one in absolute terms—may not be a useful piece of information in systems that provision circuits in discrete bandwidth amounts unless the number of different circuit bandwidths that are available for newly provisioned circuits has changed. . See, for example, ¶0013 of applicants’ specification.

By the same token, applicants' invention envisions that even a small change may be a useful piece of information—and thus should trigger the issuance of an available bandwidth message—if the change in available bandwidth changes the number of circuits that can be accommodated on a link. Thus if the thresholds are as in the above example, a change from, say, 0.4 to 0.6—which is a tiny change of only 0.2—would nonetheless trigger the issuance of an available bandwidth message because the threshold at 0.5 will have been crossed. By contrast, a change from, say, 48 to 190—a quite large change of 142 ( $=190-48$ )—would not trigger the issuance of an available bandwidth message because no threshold will have been crossed.

#### Dolganow

Dolganow, by contrast, issues an available bandwidth message (also called a PSTE) not based on when the amount of available bandwidth crosses a threshold, but rather when the available bandwidth changes by a value deemed significant from the last advertised value. Specifically, Dolganow's available bandwidth AvCR must undergo a so-called "significant change" before a new available bandwidth is advertised. Whether a change is a "significant change" does not depend on crossing some fixed threshold, as in applicants' invention but, rather, depends on a percentage of the last advertised available bandwidth value. (Dolganow, col. 1, lines 44-47, col. 2, lines 2-4.) Specifically, a change is a "significant change" if the change is greater than a particular percentage (called AvCR\_PM) of the last advertised bandwidth value. As Dolganow notes, this way of determining when to issue an available bandwidth message is a feature of the well known PNNI protocol. (Dolganow, col. 1, lines 62-67.) Indeed, that aspect of the PNNI protocol is explained in such tutorial material as that found at the Cisco Systems web page called "Understanding How PNNI Calculates and Uses Available Cell Rate Parameter (AvCR)" at [http://www.cisco.com/warp/public/121/avcr\\_22886.html](http://www.cisco.com/warp/public/121/avcr_22886.html). For the examiner's convenience, a printout of that web page is attached hereto in an Appendix. See the section entitled "How AvCR Works."

The tutorial material in the Appendix seems to indicate that a 50% change (i.e.,  $AvCR\_PM = 50$ ) is the default value in PNNI. Thus in the above example, PNNI and Dolganow might trigger the issuance of an available bandwidth message for the change from 0.4 to 0.6—which is a 50% change—just as would applicants' scheme.<sup>1</sup> However, Dolganow would also trigger the issuance of an available bandwidth message for the change from 48 to 190, that being an almost 300% increase. As already noted, such a large change would not, in applicants' invention, necessarily cause an available bandwidth message to be issued. It would depend on whether one of the fixed thresholds had been crossed.

#### Claim Amendment

Notwithstanding the difference between applicants' invention and Dolganow as just explained, applicants recognize that the Dolganow approach could be said to involve a determination of whether the available bandwidth had crossed a threshold. In Dolganow's case, that threshold would be equal to the previous value plus or minus the minimum amount change that would be deemed "significant." Mathematically, such a threshold could be expressed as  $AvCR(1 \pm AvCr\_PM)$ . However, such a threshold in Dolganow would not be fixed, as in applicants' invention. Rather, as just noted, the value of any such "threshold" in Dolganow would be dependent on the last advertised available bandwidth value.

In order to emphasize this distinction between Dolganow and applicants' invention, claim 1 has been amended to recite that the recited plurality of bandwidth thresholds are "fixed." Claim 1 has also been amended to recite that the bandwidth thresholds "are independent of the amount of bandwidth available for the link at a given time."

Amended claim 1 thus clearly distinguishes the invention from Dolganow since, contrary to the limitations of amended claim 1, Dolganow's thresholds are not "fixed" nor are Dolganow's thresholds "independent" of the available bandwidth.

---

<sup>1</sup> This example ignores for simplicity the possible ignoring in PNNI of a change of 0.2 as being too small on an absolute basis to be significant, as discussed elsewhere in these REMARKS.

Indeed, the exact opposite is true; Dolganow's thresholds are dependent on the available bandwidth.

Dolganow does make reference to a fixed threshold, which is a percentage AvCR\_mT of the total (as opposed to available) link bandwidth. See col. 2, lines 2-12 of Dolganow. However, that fixed threshold is not a threshold against which the amount of available bandwidth is compared, as recited in amended claim 1. Rather, that threshold in Dolganow is a threshold to which the change in available bandwidth is compared. If the amount of the change is less than that threshold, then no available bandwidth advertisement is issued, even if the change meets the percentage-change requirement. Dolganow does this in order to eliminate the issuance of an available bandwidth message if the absolute value of the bandwidth change is too small to be significant, even though it may be large on a percentage basis. (The PNNI tutorial material in the Appendix explains this as well.)

In view of the foregoing, it is submitted that amended claim 1 distinguishes the invention from Dolganow and is allowable.

#### **Rejection of Claims 2-7 — 35 USC 103**

The rejection of claims 2-7 as being unpatentable over Dolganow in view of MacLean is respectfully traversed.

**Regarding claims 2-7** generally, these claims distinguish the invention over the Dolganow for at least the reasons set forth hereinabove relative to amended claim 1, from which each of claims 2-7 depends either directly or indirectly.

**Regarding claims 2-5** specifically, it may well be that MacLean teaches a communication network that “allocates bandwidth to circuits...in discrete bandwidth amounts,” as claim 2 (and thus claims 3-5 dependent therefrom) recites. Thus, it may well be obvious, as the Office action notes, to utilize such a bandwidth allocation scheme in Dolganow for the reason stated in the Office action—namely “to adaptively manage bandwidth on optical links shared by multiple services.”

*However*, the fact that bandwidth may be allocated to circuits in discrete bandwidth amounts does not render obvious the use of those bandwidth amounts as the basis for establishing thresholds for determining when to issue available bandwidth messages. Any such modification of the standard PNNI percentage-change approach as disclosed by Dolganow could only be made in hindsight given the benefits of applicants' teachings. Specifically, it remained for *applicants* to teach that the use of fixed thresholds to determine when to issue available bandwidth messages may be more desirable than the prior art's percentage-change approach.

Whether or not MacLean discloses bandwidth thresholds used for *some* purpose—such as to adaptively manage bandwidth on optical links shared by multiple services, as the Office action asserts—is quite irrelevant to the question of whether it would have been obvious to use bandwidth thresholds for the purpose taught and claimed by applicants, i.e., relating to a determination as to when to issue available bandwidth messages.

**Regarding claim 3** specifically, given the foregoing, it would have been all the more non-obvious to use thresholds that “are each a predetermined amount smaller than a respective one of said discrete bandwidth amounts,” as claim 3 recites.

**Regarding claim 7** specifically, applicants well recognize that Dolganow discloses the use of PSTEs (available bandwidth advertisements) within the PNNI protocol. However, that aspect of Dolganow's disclosure is evidence of the invention's **non**-obviousness, rather than its obviousness. Specifically, as noted in Dolganow itself and in the tutorial material of the Appendix hereof, the PNNI protocol specifically features the use of a percentage-change-based criterion for determining when to issue a PSTE. Thus the art teaches away from implementing *some other* approach to determining when to issue PSTEs within the PNNI context—such as applicants' fixed-threshold-based approach. Specifically, then, the art teaches away from implementing applicants' fixed-threshold-based approach.

In view of the foregoing, it is submitted that claims 2-7 distinguish the invention from Dolganow and are allowable.

**Rejection of Claims 8-18 — 35 USC 103**

The rejection of claims 8-18 as being unpatentable over MacLean in view of Dolganow is respectfully traversed.

**Regarding claims 8-12**, what *might* be obvious would be to transmit available bandwidth messages, as disclosed by Dolganow, in a network of the type disclosed by MacLean—a network in which, as claim 8 recites, each circuit has a particular amount of bandwidth selected from a plurality of predetermined circuit bandwidths.

However, any such obvious combination would use Dolganow's disclosed percentage-based scheme for determining when the available bandwidth messages would be issued.

In particular, as noted above, Dolganow issues an available bandwidth message when the available bandwidth changes by a percentage value deemed significant from the last advertised value. There is nothing in the teachings of Dolganow or MacLean that would lead the person of ordinary skill in the art to modify the asserted Dolganow/MacLean combination in such a way as to do away with Dolganow's percentage-change-based scheme to one which transmits an available bandwidth message responsive to, as recited in claim 8, lines 12-17, a determination that the available bandwidth of a particular link has increased (decreased) from a previous value to a value at least equal to (lower than) the next higher (lower) one of the predetermined circuit bandwidths.

The Office action asserts that the scheme as recited in claim 8 (and thus incorporated into its dependent claims 9-12) would have been obvious to the person of ordinary skill in the art, citing Dolganow at col. 1, lines 41-44. However, the cited passage in Dolganow simply explains that overall network efficiency would be decreased if an advertisement were to be issued with each bandwidth change. Thus the motivation that the cited passage of Dolganow provides is the motivation to use a scheme in which only certain changes cause an advertisement to be issued.

However, the cited passage in Dolganow does not disclose or suggest claim 8's particular manner of determining when to issue an available bandwidth

message—namely looking at whether the available bandwidth of a particular link has increased (decreased) from a previous value to a value at least equal to (lower than) the next higher (lower) one of the predetermined circuit bandwidths, as recited in claim 8, lines 12-17. Indeed, what Dolganow discloses in order to avoid “decreasing overall network efficiency” is a scheme based instead on percentage changes.

Stated another way, Dolganow’s “efficiency” argument pointed to in the Office action does provide a motivation. But the motivation is provides is to have having *some scheme or other* for limiting the number of available bandwidth messages that are issued. Dolganow’s efficiency motivation, however, does not lead to knowing what the nature of that scheme might be. Indeed, Dolganow teaches one way of implementing a scheme for limiting how many available bandwidth messages are issued—based on percentage changes. By contrast, applicants teach another scheme as defined in claim 8—one that is neither shown nor suggested by Dolganow or MacLean, taken singly or in combination.

**Regarding claim 12** specifically, the points made above relative to claim 7 apply to claim 12 as well.

**Regarding claims 13-16**, it is noted that independent claim 13 was rejected for the same reasons advanced for the rejection of claim 8.

However, applicants respectfully submit that claims 13-16 are allowable for at least the reasons set forth above relative to claim 8. Specifically, there is nothing in the cited references showing or suggesting, as recited at claim 13, lines 9-11, the use of “a change in the number of said circuit bandwidths that are available on the associated link...” as the criterion for initiating the transmission of an available bandwidth message. Again, any obvious combination of MacLean with Dolganow would continue to use Dolganow’s percentage-change criterion as the basis for determining when an available bandwidth message should be issued.

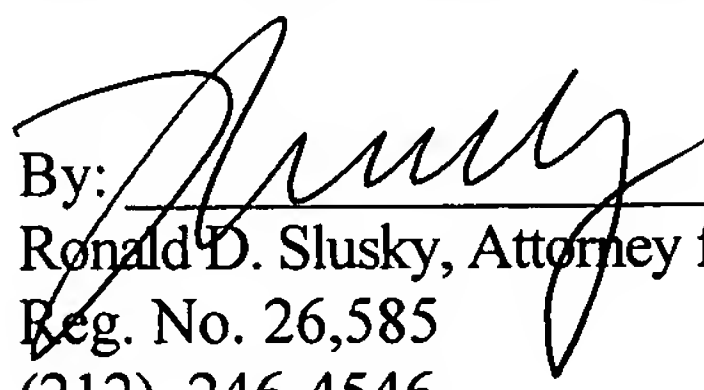
**Regarding claims 17 and 18**, each of these claims references various ones of claims 1-16 discussed above. Thus claims 17 and 18 are submitted to be allowable for at least the reasons set forth hereinabove relative to claims 1-16.

In view of the foregoing, it is submitted that claims 8-18 distinguish the invention from Dolganow and are allowable.

\*\*\*\*\*

In view of the foregoing, it is submitted that amended claim 1, as well as claims 2-18, are all in condition for allowance and reconsideration is requested.

Respectfully submitted,  
Bruce Gilbert Cortez et al

By:   
\_\_\_\_\_  
Ronald D. Slusky, Attorney for Applicants  
Reg. No. 26,585  
(212) 246-4546

Office of Ronald D. Slusky  
Registered Patent Attorney  
353 West 56<sup>th</sup> St.—Suite 5L  
New York, New York 10019-3775  
Date: 2/21/08

# APPENDIX

(8 pages)

# Understanding How PNNI Calculates and Uses Available Cell Rate Parameter (AvCR)

Document ID: 22886

## Contents

- Introduction
- Prerequisites
  - Requirements
  - Components Used
  - Conventions
- What is AvCR?
- How AvCR Works
  - Example
- Problem
- Solution
- Related Information

## Introduction

The Private Network-Node Interface (PNNI) protocol is designed to distribute topology information between ATM switches and to establish dynamic connections across ATM networks. The Available Cell Rate (AvCR) attribute is one of the most important PNNI topology state parameters.

This document explains how to check, calculate, and troubleshoot AvCR when switched virtual circuits (SVCs) or Soft permanent virtual circuits (Soft-PVCs) are not created due to unavailable cell rate.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions.

### Conventions

For more information on document conventions, refer to the [Cisco Technical Tips Conventions](#).

TAC Notice: What's Changing on TAC Web



Help us help you.

Please rate this document.

- Excellent
- Good
- Average
- Fair
- Poor

This document solved my problem.

- Yes
- No
- Just browsing

Suggestions for improvement:

(256 character limit)

Optional contact information:

Name:

Email:

Send

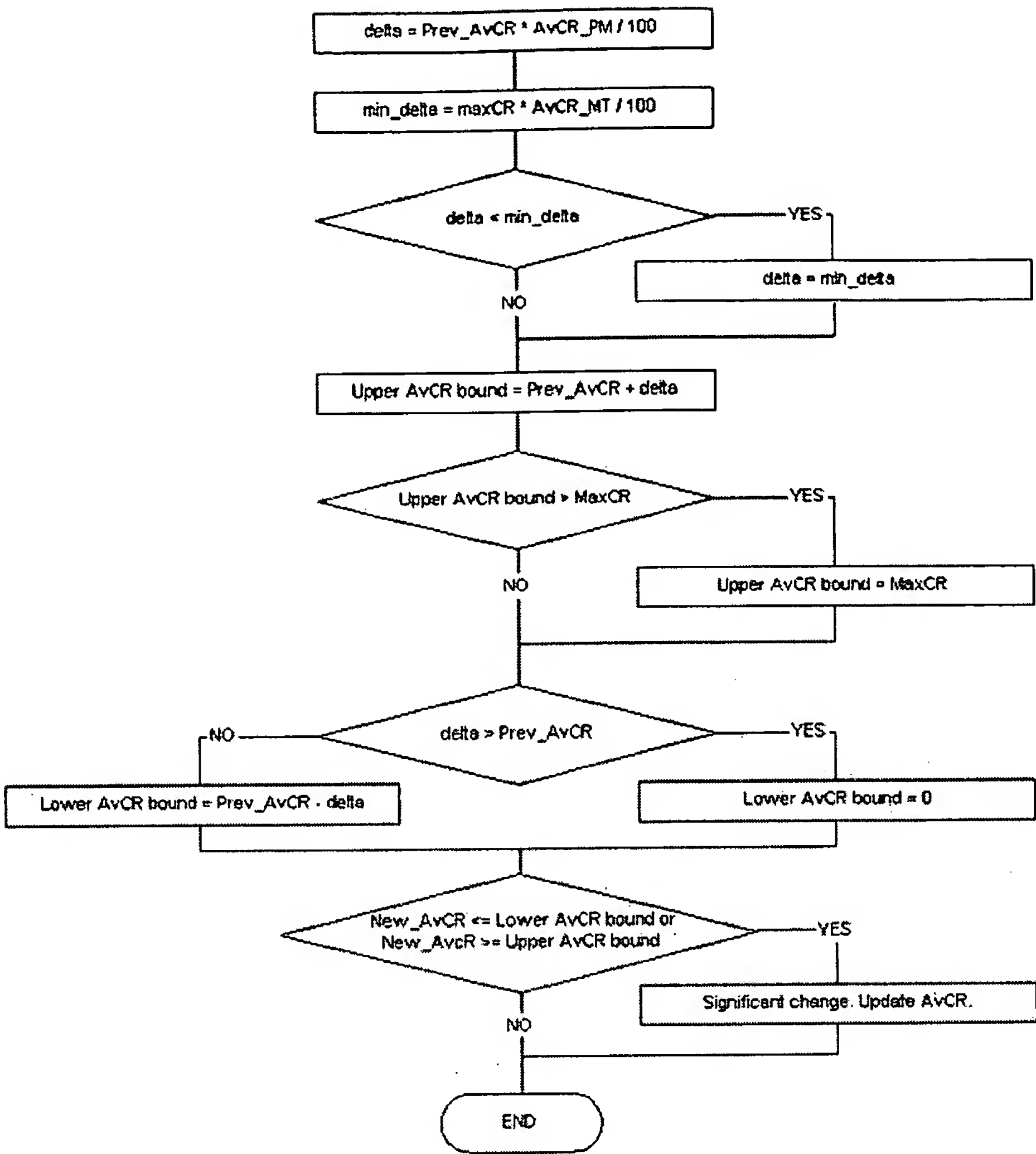
## What is AvCR?

AvCR is a topology state attribute that measures an available link capacity. This attribute is used to determine whether a given link or node is acceptable and/or desirable to carry a connection. Every ATM switch calculates this value and exchanges it between other ATM switches.

## How AvCR Works

ATM switches do not update AvCR attributes immediately after a change has occurred in the switch's resources. Every virtual circuit (VC) creation/deletion changes a local available bit rate value. However, the switch waits until the changes in AvCR become significant before it updates this value. As AvCR approaches a value of zero, changes in AvCR are more important. For example, transitioning AvCR from a non-zero value to zero implies that no calls are processed where some were processed before. This is an important change. Likewise, transitioning from zero to non-zero values implies that some number of calls are now processed where none were processed before. This is an equally important change.

Changes in AvCR are measured in terms of a proportional difference from the last value advertised. An AvCR proportional multiplier (AvCR\_PM) parameter, expressed as a percentage, provides flexible control over the definition of "significant change" for AvCR. There is also an AvCR minimum threshold (AvCR\_MT) parameter, expressed as a percentage of maximum cell rate (maxCR). This ensures that the range of insignificance is non-zero. Given a previous value for AvCR, the algorithm establishes an upper and lower bound for AvCR values. These define a range of insignificance. Any new value for AvCR computed that is within these bounds is not considered a significant change from the previous value. Any new value for AvCR that is outside the bounds is considered a significant change.



Variable	Description
MaxCR	Maximum cell rate for service category.
Prev_AvCR	Previously advertised value for AvCR for service category.
AvCR_PM	Proportional Multiplier. The percentage of the last advertised AvCR such that a change within the range $AvCR \pm (AvCR * AvCR\_PM / 100)$ is not considered significant. (Default value 50).
AvCR_MT	Minimum Threshold. The percentage of maxCR such that changes in AvCR of less than that amount from the last advertised value are never considered significant, even when the rule for AvCR_PM would indicate that the change was significant. (Default value 3).

Example

This example presupposes that there are no VCs traveling through the ATM OC3 interface. A certain number of CBR connections with PCR = 10 Mb must be created.

These are the initial values for all variables required to calculate how many VCs are created before AvCR is updated:

Variable	Value
MaxCR	155519
AvCR	147743
AvCR_PM	50
AvCR_MT	3

With the help of the values from the table and in the algorithm given in the flowchart above, you obtain this:

```
delta = Prev_AvCR*(AvCR_PM/100) = 147743 * ( 50 / 100 ) = 73871
min_delta = maxCR*(AvCR_MT/100) = 155519 * ( 3 / 100 ) = 4665
```

```
Since 73871 > 4665, then, delta > min_delta.
Then Upper AvCR = Prev_AvCR+delta = 221614
```

```
Since MaxCR = 155519 and Upper AvCR = 221614, then Upper AvCR > MaxCR
Therefore Upper AvCR = 155519
```

```
Now, since delta = 73871 and Prev_AvCR = 14774, then delta < Prev_AvCR
Therefore
```

```
Lower AvCR = Prev_AvCR - delta = 147743 - 73871 = 73872
```

Based on the formulas above, AvCR is updated if a new value of AvCR is lower or equal to 73872. In addition, at least eight CBR VC should be created to fulfill this condition.

These are seven CBR VCs that are created:

```
Casimir#show atm vc conn-type soft-vc
Interface      VPI  VCI  Type  X-Interface  X-VPI  X-VCI  Encap  Status
ATM0/0/2       0    251  SoftVC ATM0/1/3    0      62     UP
ATM0/0/2       0    252  SoftVC ATM0/1/3    0      63     UP
ATM0/0/2       0    253  SoftVC ATM0/1/3    0      64     UP
ATM0/0/2       0    254  SoftVC ATM0/1/3    0      65     UP
ATM0/0/2       0    255  SoftVC ATM0/1/3    0      66     UP
ATM0/0/2       0    256  SoftVC ATM0/1/3    0      67     UP
ATM0/0/2       0    257  SoftVC ATM0/1/3    0      68     UP
```

```
Casimir#show atm pnni resource-info a0/1/3
PNNI:56.1 Insignificant change parameters
acr pm 50, acr mt 3, cdv pm 25, ctd pm 50, resource poll interval 5 sec
Interface insignificant change bounds shown in square brackets
Interface 80103000 (ATM0/1/3)
  CBR      : MCR 155519, ACR 147743 [73871,155519], CTD 50 [25,75],

[ snip ]
```

```
Casimir#show atm interface resource a0/1/3

[ snip ]
```

```
Resource Management state:
  Available bit rates (in Kbps):
    77743 cbr RX, 77743 cbr TX, 77743 vbr RX, 77743 vbr TX,
    77743 abr RX, 77743 abr TX, 77743 ubr RX, 77743 ubr TX
  Allocated bit rates:
    70000 cbr RX, 70000 cbr TX, 0 vbr RX, 0 vbr TX,
    0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
  Best effort connections: 0 pvcs, 0 svcs
```

These are eight CBR VCs that are created:

```
Casimir#show atm vc conn-type soft-vc
Interface      VPI  VCI  Type  X-Interface  X-VPI X-VCI Encap  Status
ATM0/0/2        0   251  SoftVC ATM0/1/3      0    62          UP
ATM0/0/2        0   252  SoftVC ATM0/1/3      0    63          UP
ATM0/0/2        0   253  SoftVC ATM0/1/3      0    64          UP
ATM0/0/2        0   254  SoftVC ATM0/1/3      0    65          UP
ATM0/0/2        0   255  SoftVC ATM0/1/3      0    66          UP
ATM0/0/2        0   256  SoftVC ATM0/1/3      0    67          UP
ATM0/0/2        0   257  SoftVC ATM0/1/3      0    68          UP
ATM0/0/2        0   258  SoftVC ATM0/1/3      0    69          UP
```

```
Casimir#show atm pnni resource-info a0/1/3
PNNI:56.1 Insignificant change parameters
acr pm 50, acr mt 3, cdv pm 25, ctd pm 50, resource poll interval 5 sec
Interface insignificant change bounds shown in square brackets
Interface 80103000 (ATM0/1/3)
  CBR      : MCR 155519, ACR 67743 [33871,101614], CTD 50 [25,75],
```

[ snip ]

```
Casimir#show atm interface resource a0/1/3
```

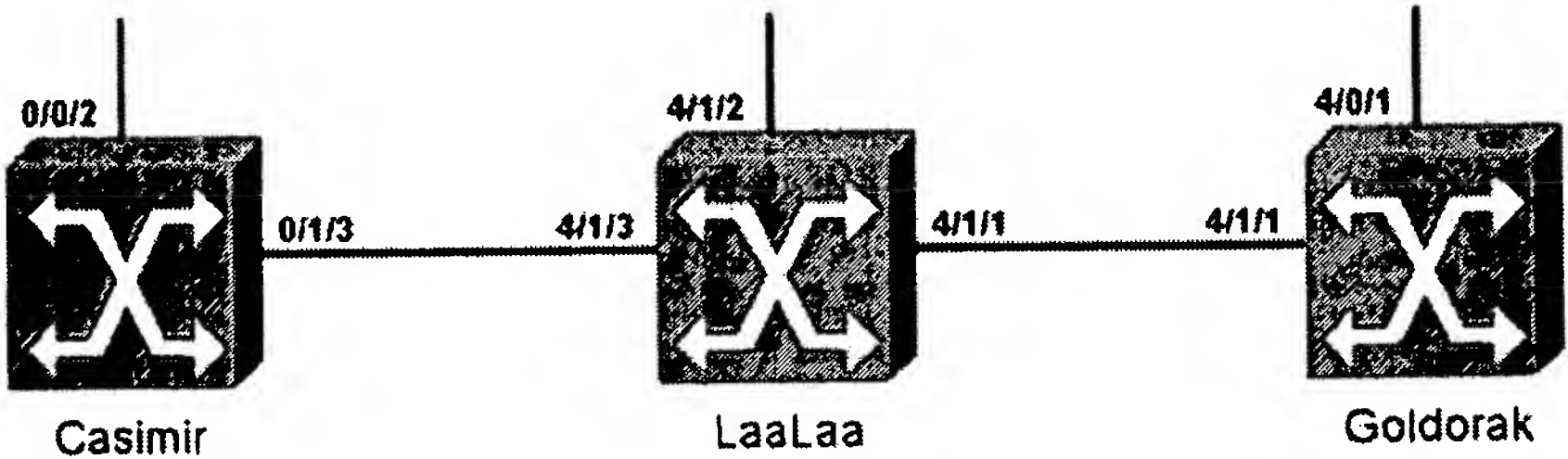
[ snip ]

```
Resource Management state:
  Available bit rates (in Kbps):
    67743 cbr RX, 67743 cbr TX, 67743 vbr RX, 67743 vbr TX,
    67743 abr RX, 67743 abr TX, 67743 ubr RX, 67743 ubr TX
  Allocated bit rates:
    80000 cbr RX, 80000 cbr TX, 0 vbr RX, 0 vbr TX,
    0 abr RX, 0 abr TX, 0 ubr RX, 0 ubr TX
  Best effort connections: 0 pvcs, 0 svcs
```

Problem

An AvCR rate parameter is not updated if changes made are insignificant. A problem also arises if SVC/Soft-PVC is not created due to the unavailability of a requested cell rate, even though there are enough resources to process the call setup.

In order to illustrate and troubleshoot this problem, this setup is used:



Goldorak wants to create Soft-PVC (CBR, PCR=80Mb) from interface a4/0/1 to Casimir a0/0/2.

```
Goldorak#show atm vc conn-type soft-vc interface a4/0/1
Interface      VPI  VCI  Type  X-Interface  X-VPI X-VCI Encap  Status
ATM4/0/1        0   400  SoftVC NOT CONNECTED
```

This indicates why Soft-PVC is down:

```
Goldorak#show atm vc int a4/0/1 0 400

Interface: ATM4/0/1, Type: oc3suni
VPI = 0 VCI = 400
Status: NOT CONNECTED
Time-since-last-status-change: 19:22:01
Connection-type: SoftVC
Cast-type: point-to-point
Soft vc location: Source
Remote ATM address: 47.0091.8100.0000.0060.3e5a.4501.4000.0c80.0020.00
Remote VPI: 0
```

```

Remote VCI: 400
Soft vc call state: Inactive
Number of soft vc re-try attempts: 1405
First-retry-interval: 5000 milliseconds
Maximum-retry-interval: 60000 milliseconds
Next retry in: 8876 milliseconds
  Last release cause: 37,user cell rate not available
Aggregate admin weight: 0

```

```
[ snip ]
```

```

Rx service-category: CBR (Constant Bit Rate)
Rx pcr-clp01: 80000
Rx scr-clp01: none
Rx mcr-clp01: none
Rx cdvt: 1024 (from default for interface)
Rx mbs: none
Tx connection-traffic-table-index: 80
Tx service-category: CBR (Constant Bit Rate)
Tx pcr-clp01: 80000
Tx scr-clp01: none
Tx mcr-clp01: none
Tx cdvt: none
Tx mbs: none

```

The debug atm sig-all a4/0/1 and debug atm SIG-all a2/0/0 commands at Goldorak show that PNNI refuses the VC creation.

```

.Mar 16 09:05:05.061: ATMSOFT(ATM4/0/1 vpi = 0 ; vci = 400)
soft-vc retry timer
  expired

.Mar 16 09:05:05.061: ATMSOFT(ATM4/0/1 vpi = 0 ; vci = 400) soft-vc retry to
open another soft-vc

.Mar 16 09:05:05.061: ATMSOFT(ATM4/0/1 vpi = 0 ; vci = 400) sending SETUP msg
to open soft-vc
.Mar 16 09:05:05.061: ATMAPI: (c->s): SETUP ci: 0x620A59EC mp: 0x0 ei: 0x0
.Mar 16 09:05:05.061: ATMSIG: Called len 20
.Mar 16 09:05:05.061: ATMSIG: Calling len 20
.Mar 16 09:05:05.061: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0) build Setup
msg, Null(U0) state
.Mar 16 09:05:05.061: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0) API - from
sig-client ATM_OWNER_ATM_SOFTVC
.Mar 16 09:05:05.061: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0) API event:
Req Setup in P2P Null(U0), in P2MP Multipoint Null
.Mar 16 09:05:05.061: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0)API P2P Null(U0) ->
Call Initiated(U1)
.Mar 16 09:05:05.061: SIG->CC: Svc Event Rcvd Setup, State Call
Initiated(U1)atmsig_set_e2e_extqos_def:serv_category 0 extQos 0,
end2enddelayIe 0

.Mar 16 09:05:05.061: ATMSIG: sending source route req to routing
.Mar 16 09:05:05.061: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0)
sending source
route req
.Mar 16 09:05:05.061: ATMSIG: ROUTING INTERFACE : call ref = 2534(0x9E6); call
end pt ref = 0(0x0); calling port : (2/0/0) : 0 ;
pt2mpt = 0; call_is_vp = 0x0; lowest precedence = 0x0; scope = 15;
target.type = 0x2; target addr = 47.00918100000000603E5A4501.40000C800020.00
.Mar 16 09:05:05.065: Port List : no of ports = 0
.Mar 16 09:05:05.065: CC->SIG: Svc Event Req Call Proceeding,
State Call Initiated(U1)
.Mar 16 09:05:05.065: ATMSIG_NNI: processing src_route message from pnni
.Mar 16 09:05:05.065: ATMSIG: ROUTING INTERFACE :
err_code = PNNI_USER_CELL_RATE_UNAVAILABLE
(0x8) call ref = 2534(0x9E6); call end pt ref = 0(0x0);
calling port : (2/0/0) : 0 ;
pt2mpt = 0; call_is_vp = 0x0; lowest precedence = 0x0; scope = 15;
target.type = 0x2; target addr = 47.00918100000000603E5A4501.40000C800020.00
.Mar 16 09:05:05.065: Port List : no of ports = 0
.Mar 16 09:05:05.065: ATMSIG(ATM2/0/0 0,400 - 2534/00): (vcnum:0) source
route failed; PNNI_USER_CELL_RATE_UNAVAILABLE (0x08)
.Mar 16 09:05:05.065: ATMSIG: Called Party Addr:
47.00918100000000603E5A4501.40000C800020.00
.Mar 16 09:05:05.065: ATMSIG: Calling Party Addr:
47.0091810000000050E2030501.40000C820010.00
.Mar 16 09:05:05.065: CC->SIG: Svc Event Req Release,
State Call Initiated(U1)
.Mar 16 09:05:05.065: ATMSIG(ATM2/0/0 0,400 - 2534/00):

```

```
(vcnum:0) API - notifying
Release event to client ATM2/0/0
.Mar 16 09:05:05.065:

ATMAPI: (c<-s): RELEASE ci: 0x620A59EC, cause: 0x25
.Mar 16 09:05:05.065: ATMSOFT(ATM4/0/1 vpi = 0 ; vci = 400) received Rel at src
```

The PNNI topology information here shows who is responsible for the failure. The information is the same on the switches. It contains information about cell rate values.

```
Goldorak#show atm pnni topology detail

[ snip ]

Node 9 (name: Casimir, type: LS1010, ios-version: 12.0)
Node ID.: 56:160:47.009181000000000603E5A4501.00603E5A4501.00
Node AESA: 47.009181000000000603E5A4501.00603E5A4501.01
Leadership Priority: 0, Claims PGL: No, Transit Calls: Allowed
Ancestor: No, Nodal Representation: Simple, Connected: Yes
More P2MP Branch Points: Yes, Non-Transit For PGL Election: No
Node has 2 Links (Space for 4 Links)
  port 80103000, ATM0/1/3, remote port 82103000, ATM4/1/3,
  neighbor Laalaa
  type horizontal, vp capable, gcac clp0, agg-token 0
  forward link parameters
    maxcr  avcr  ctd  cdv  clr0  clr01  aw  crm  vf
  CBR      155519 67743 50   34   10    10   5040 n/a  n/a

[ snip ]

  backward link parameters
    maxcr  avcr  ctd  cdv  clr0  clr01  aw  crm  vf
  CBR      155519 67743 50   34   10    10   5040 n/a  n/a

[ snip ]
```

The reason why Goldorak is unable to create a VC is because the link between LaaLaa and Casimir has only 67 Mb of AvCR.

Check the resources at the Casimir switch by doing this:

```
Casimir#show atm interface resource a0/1/3

[ snip ]

Resource Management state:

  Available bit rates (in Kbps):

  97743 cbr RX, 97743 cbr TX, 97743 vbr RX, 97743 vbr TX,
  97743 abr RX, 97743 abr TX, 97743 ubr RX, 97743 ubr TX
  Allocated bit rates:
  50000 cbr RX, 50000 cbr TX, 0 vbr RX, 0 vbr TX,
```

There are 97 Mb of cell rate available. This is enough to process the call.

This situation occurs based on this scenario:

If you have eight SVCs on this interface, the allocated bandwidth adds up to 80 Mb. On the other hand, the initial available bandwidth for CBR is 147 M. This leads to a current AvCR of 67 Mb (147 Mb - 80 Mb = 67 Mb). Since this is a considerable change in bandwidth, update all the ATM switches where the AvCR is 67 Mb.

If Casimir shuts down three SVCs, you get 30 Mb of additional bandwidth. Then the AvCR is 97 Mb (67 Mb + 30 Mb = 97 Mb). In this case, the change is not considered to be significant. Therefore, there is no need to update the switches that have 97 Mb, or for a PNNI topology update.

# Solution

To solve the problem of the AvCR rate parameter not updating if changes made are insignificant, perform these :

1. **Shut/no shut** an interface where the AvCR attribute information is inconsistent with the PNNI topology information. AvCR is then recalculated from scratch. In the example , reset interfaces a0/1/3 at Casimir or a4/1/4 at LaaLaa.
2. Tune the AvCR\_PM and AvCR\_MT parameters so that an insignificant change in AvCR is declared as significant.
  - In an ATM environment with a high number of VCs created and removed, these changes overflow the network through a high volume of PNNI updates and resource recalculations.
  - The changes should be done on all switches. Otherwise different AvCR values are received in different directions.

**Example:**

```

LaaLaa
!
node 1 level 56 lowest
  ptse significant-change acr-pm 10
!
!--- AvCR_PM is changed to 10%.
!
```


The output of the **show atm pnni resource-info** command displays insignificant change parameters:

```

Casimir#show atm pnni resource-info a0/1/3
PNNI:56.1 Insignificant change parameters
acr pm 10,  acr mt 3,  cdv pm 25,  ctd pm 50,  resource poll interval 5 sec

[ snip ]
```

**Related Information**

- [ATM Support Resources](#)
- [ATM Forum PNNI 1.0 Specification](#) 
- [Configuring ATM Routing and PNNI](#)
- [Technical Support - Cisco Systems](#)

<a href="#">Home</a>	<a href="#">How to Buy</a>	<a href="#">Login</a>	<a href="#">Register</a>	<a href="#">Feedback</a>	<a href="#">Site Map</a>	<a href="#">Help</a>
----------------------	----------------------------	-----------------------	--------------------------	--------------------------	--------------------------	----------------------

All contents are Copyright © 1992-2005 Cisco Systems, Inc. All rights reserved. [Important Notices](#) and [Privacy Statement](#).